CLAIMS

1. A manually-powered drive device comprising:

a pistol-shaped, hollow housing comprising a barrel portion and a hand grip portion separated by an intermediate frame portion, the barrel portion and the hand grip portion extending substantially perpendicularly from one another; and

a drive train substantially disposed within the pistol-shaped housing, the drive train configured to transmit motion and driving force and comprising:

a transmission assembly comprising a transmission shaft extending laterally in the intermediate frame portion and configured to laterally slide between alternate positions, the transmission shaft comprising a first circumferential recess spaced apart from a second circumferential recess along a portion of the transmission shaft; and

a transmission selector spring, wherein a distal end portion thereof resiliently flexes and removably slidably couples within one of the first circumferential recess and the second circumferential recess as the transmission shaft is laterally slid between alternate positions, thereby selecting the desired rotational direction for manipulating fasteners.

2. The manually-powered drive device of claim 1, the drive train further comprising a trigger assembly comprising:

a geared trigger comprising a spatulate lower portion, an intermediate portion, and an angled upper portion, the spatulate lower portion configured to be gripped by an operators hand, the intermediate portion comprising a first aperture therethrough, and the angled upper portion comprising an arcuate transverse slot therethrough and an arcuate gear rack, the geared trigger configured to initiate the motion and driving force during its drive and return strokes;

a torsion trigger spring comprising a first trigger spring end portion configured for coupling with the geared trigger and a second trigger spring end portion configured for coupling with an internal portion of the pistol-shaped housing, the torsion trigger spring configured to bias the geared trigger in a disengaged position after each drive stroke;

a trigger stop shaft extending through the arcuate transverse slot, the trigger stop shaft configured to limit the displacement of the geared trigger between the drive and return strokes; and

a trigger shaft extending through the first aperture, the trigger shaft configured to allow the geared trigger to pivot thereon between the drive and return strokes.

3. The manually-powered drive device of claim 2, the drive train further comprising a clutch assembly comprising:

a clutch spur gear comprising a first hub on a face thereof and a second two-tiered, central, aperture through the first hub and the clutch spur gear, a first tier of the second aperture defined in a distal end portion of the first hub, the clutch spur gear configured to couple with the arcuate gear rack for transmitting motion and driving force during the drive strokes;

a clutch plate comprising a second hub, a first annular ring having a plurality of wedge-shaped teeth on a face thereof, and a third two-tiered, central, through aperture extending through the clutch plate and the second hub, a first tier of the third aperture for slidably coupling with the first hub, the clutch plate configured to couple with the clutch spur gear during the drive and return strokes;

a clutch spring comprising a first clutch spring end portion seating within the first tier of the second aperture and against a second tier of the second aperture and a second clutch spring end portion seating against the second tier of the third aperture, the clutch spring configured to bias the clutch plate in a disengaged position after each drive stroke;

a geared clutch plate comprising a spur gear with a second annular ring having a plurality of wedge-shaped teeth on a face thereof and a fourth central, through aperture for receiving the second hub, the geared clutch plate configured to couple with the clutch plate during the drive strokes and to decouple with the clutch plate during the return strokes.

a three-tiered clutch shaft extending through the third aperture, the clutch spring, and the second aperture, a first tier of the clutch shaft stopping the second hub, a second tier of the clutch shaft extending through both the first tier of the second aperture and a second tier of the third aperture defined in a distal end portion of the third hub, a third tier of the clutch shaft extending through the second tier of the second aperture, the clutch shaft configured to allow the clutch spur gear, the clutch plate, and the geared clutch plate to pivot thereon between the drive and return strokes;

the clutch assembly configured to provide a locked driving connection for the geared clutch plate and the clutch plate upon their rotation during the drive strokes and to free the clutch plate for detached relative movement upon its rotation during the return strokes.

4. The manually-powered drive device of claim 3, the drive train further comprising a back drive lock assembly comprising:

a back drive lock comprising an annularly, cylindrical portion and a wedge-shaped portion configured to removably couple with the geared clutch plate, the back drive lock configured to limit the geared clutch plate from turning in a disengaged direction during the return stroke;

a back drive stop shaft configured to limit the displacement of the back drive lock during the return strokes;

a torsion back drive spring comprising a first back drive spring end portion configured for coupling with the back drive lock and comprising a second back drive spring end portion configured for coupling with an internal portion of the pistol-shaped housing, the torsion back drive spring configured to bias the back drive lock against the back drive stop shaft in an engaged position with the geared clutch plate after each drive stroke; and

a back drive shaft extending through the annularly, cylindrical portion of the back drive lock, the back drive shaft configured to allow the back drive lock to pivot thereon during the drive strokes;

the back drive lock assembly configured to retain the geared clutch plate in a fixed position upon rotation of the clutch plate during the return strokes.

5. The manually-powered drive device of claim 4, the drive train further comprising an idler assembly comprising:

an idler spur gear comprising a fifth central aperture extending therethrough, the idler spur gear configured to couple with the geared clutch plate for transmitting motion and driving force during the drive strokes; and

an idler shaft extending through the fifth central aperture, the idler shaft configured to allow the idler spur gear to pivot thereon; and

the transmission assembly further comprising a transmission spur gear comprising a sixth central aperture extending therethrough, the transmission shaft extending through the sixth aperture, the transmission spur gear configured to couple with the idler spur gear to rotate in an engaged direction; and

the idler assembly configured to affect the direction of rotation of the geared clutch plate and the transmission spur gear without affecting the gear ratio therebetween.

6. The manually-powered drive device of claim 5, the drive train further comprising at least one drive assembly comprising:

a first bevel gear comprising a third hub on a teeth opposing face thereof and a seventh central aperture defined in a distal end of the third hub; and

a drive puck comprising a drive tip for inserting and coupling within the seventh aperture and a puck portion defining an eighth central aperture in the distal end thereof for both removably coupling with and transmitting the motion and driving force to a removable attachment tool; and

the transmission assembly further comprising second and third opposing bevel gears each comprising a ninth central aperture extending therethrough, the transmission shaft extending through the ninth apertures, the second and third opposing bevel gears each configured to transmit motion and driving force to the first bevel gear;

the transmission selector spring coupled with the at least one drive assembly; and

wherein the transmission spur gear, the first circumferential recess, and the second circumferential recess are between the second and third opposing bevel gears.

7. A manually-powered drive device comprising

a pistol-shaped, hollow housing comprising a barrel portion and a hand grip portion separated by an intermediate frame portion, the barrel portion and the hand grip portion extending substantially perpendicularly from one another; and

a drive train substantially disposed within the pistol-shaped housing, the drive train configured to transmit motion and driving force and comprising:

a first drive assembly extending coaxially in the barrel portion of the housing, the first drive assembly comprising a first bevel gear coupled to a first drive puck, the first drive puck defining a central aperture in a distal end thereof for both removably coupling with and transmitting motion and driving force to a removable attachment tool; and

a second drive assembly extending in the intermediate frame portion between any acute angle and any obtuse angle to the first drive assembly, the second drive assembly comprising a second bevel gear coupled to a second drive puck, the second drive puck defining a central aperture in a distal end thereof for both removably coupling with and transmitting motion and driving force to a removable attachment tool.

8. The manually-powered drive device of claim 7, the second drive assembly extending in the intermediate frame portion substantially perpendicular to the first drive assembly.

9. The manually-powered drive device of claim 7, the drive train further comprising:

a transmission assembly comprising a transmission shaft extending laterally in the intermediate frame portion and comprising first and second circumferential recesses, the transmission shaft configured to laterally slide between alternate positions and to alternately, removably couple with the first drive assembly and the second drive assembly; and

a transmission selector spring comprising a protrusion for one end portion thereof, the protrusion configured to flex and removably slidably couple within the first circumferential recess or the second circumferential recess as the transmission shaft laterally slides between alternate positions, thereby selecting the desired rotational direction for manipulating fasteners.

10. A manually-powered drive device assembly comprising:

a manually-powered drive device comprising:

a pistol-shaped, hollow housing comprising a barrel portion and a hand grip portion separated by an intermediate frame portion, the barrel portion and the hand grip portion extending substantially perpendicularly from one another; and

a drive train substantially disposed within the pistol-shaped housing, the drive train configured to transmit motion and driving force and comprising:

a transmission assembly comprising a transmission shaft extending laterally in the intermediate frame portion and configured to laterally slide between alternate positions, the transmission shaft comprising a first circumferential recess spaced apart from a second circumferential recess along a portion of the transmission shaft; and

a transmission selector spring, wherein a distal end portion thereof resiliently flexes and removably slidably couples within one of the first circumferential recess and the second circumferential recess as the transmission shaft is laterally slid between alternate positions, thereby selecting the desired rotational direction for manipulating fasteners; and

a removable attachment tool removably coupled with the manually-powered drive device, the removable attachment tool configured to transmit the motion and driving force to a fastener for manipulation.

11. The manually-powered drive device assembly of claim 10, the removable attachment tool comprising a removable wand assembly comprising:

a wand housing comprising a hollow boxlike portion and an elongate tubular portion having an inner end in open communication with the boxlike portion, the tubular portion projecting outwardly from the boxlike portion and having an outer end configured to removably couple with the manually-powered drive device; and

a wand drive train substantially disposed within the wand housing and comprising:

a box end wrench drive assembly disposed substantially within the boxlike portion of the wand housing in an operative position and configured to transmit the motion and driving force to the fastener for manipulation;

a first bevel gear disposed substantially within the boxlike portion of the wand housing and coupled with the box end wrench drive assembly, the first bevel gear comprising a hub on a face thereof, the distal end of which defining a central aperture, the first bevel gear configured to transmit the motion and driving force to the box end wrench drive assembly; and

a drive shaft extending coaxially within and along a length of the elongate tubular portion of the wand housing and comprising an outer end portion removably coupled to the manually-powered drive device and an inner end portion coupled to the central aperture of the first

bevel gear, the drive shaft configured to transmit the motion and driving force to the first bevel gear.

12. The manually-powered drive device assembly of claim 11, the a boxlike portion at an angle of approximately 5° to approximately 90° from a longitudinal lower axis of the tubular portion.

13. The manually-powered drive device assembly of claim 11, the boxlike portion at an angle of approximately 10° to approximately 30° from a longitudinal lower axis of the tubular portion.

14. The manually-powered drive device assembly of claim 11, the outer end of the tubular portion comprising at least one protrusion configured to removably couple with the manually-powered drive device to inhibit the wand housing from rotating.

15. The manually-powered drive device assembly of claim 11, the box end wrench drive assembly comprising a second bevel gear coupled with the first bevel gear, the second bevel gear comprising an elongate sleeve therethrough defining a drive opening.

16. The manually-powered drive device assembly of claim 15, the second bevel gear comprising a diametral pitch of approximately 48, approximately 60 teeth, and a pitch diameter of approximately 1.250 inches.

17. The manually-powered drive device assembly of claim 11, the first bevel gear comprising a diametral pitch of approximately 48, approximately 30 teeth, and a pitch diameter of approximately 0.625 inches.

18. The manually-powered drive device assembly of claim 11, the outer end portion and the inner end portion of the drive shaft each comprising a large, cylindrical tier configured to abut against an outer internal portion and an inner internal portion respectively of the tubular portion to retain the drive shaft in an operative position, an intermediate, cylindrical tier configured to be supportably received by the outer internal portion and the inner internal portion respectively of the tubular portion to allow the drive shaft to freely rotate thereon, and a small, drive tip tier configured to couple with the at least one drive assembly and the central aperture of the first bevel gear respectively.

19. The manually-powered drive device assembly of claim 11, the removable attachment tool comprising a removable drive bit.

20. The manually-powered drive device assembly of claim 19, the removable drive bit being one of a Philips drive bit, a square drive bit, a slot drive bit, a star drive bit, an Allen drive bit, a hexagonal drive bit, a socket drive bit, an off-set drive bit, a Pozi drive bit, a Torx® drive bit, a clutch drive bit, cup-hook eyelet drive bit, and any double-end drive bit combination thereof.

* * * * *